Can I Build Here?
Alaska Tribal Resilience Learning Network
Information Session

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GUIDING QUESTION:

How are structures affected by permafrost thaw, and how can we work with those changes?
STATE OF OUR STATE
Alaska is getting warmer.
Alaska is getting wetter

Annual precipitation trend, 1970–2019


Data source: NOAA/National Snow and Ice Data Center & National Weather Service
What does warmer+wetter mean for housing?
More ground instability in certain soils -- warmer temps and water both contribute to soil thaw

**WATER IS FOUNDATION ENEMY #1**
- **PRIORITY #1:** Water must be kept away from the foundation
Not all permafrost is created equal.
Know what’s under there before you build
KNOW YOUR SITE
(FIRST AND FOREMOST)
SITE SELECTION
EXAMPLE:
The BIG Picture: Nelson Island
IT’S ALL BEDROCK
At 5ft to 40ft below grade
Is blasting and gravel pad construction the best foundation type for these soils?
Or would pilings be better suited (with less site disturbance)?
MAKE THE SITE WORK FOR YOU
(Common problems and their solutions)
PROBLEM: Poor site grading
SOLUTIONS

Analyze the site for suitability (drainage paths/accumulation areas)

Geotextile fabrics to support fill layer from the organic layer
PROBLEM:
Unstable ground impacts “big systems” in big ways
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SOLUTION: Localized sewage treatment
PROBLEM:
Too many bearing points (posts) underneath (many locations for differential settling to occur)

THESE STAIRS ARE MOVING INDEPENDENTLY OF THE HOUSE
PROBLEM:
Too many additions and too many posts
(keep it simple!)
SOLUTIONS
Continuous beams (as few as possible)

The beauty of steel...
SOLUTION:
Continuous beams (as few as possible)
The beauty of steel...
PROBLEM:
Fixed stair connection (these stairs will fail again)

This is also problematic
SOLUTIONS

Hinged stairs

Cantilevered decks that are structurally tied-in to the building
PROBLEM:
MAINTENANCE:
House was not re-leveled and eventually sank into ground
PROBLEM:

MAINTENANCE:

Water was allowed to reach the foundation beams
PROBLEM:
MAINTENANCE:
Gutter downspouts not included/maintained
PROBLEM:
MAINTENANCE:
Foundation not re-leveled; house is tilting
SOLUTION:

Avoid bearing points *underneath* the house; keep them along the perimeter.

Keep it simple: Make the foundation easily accessible and adjustable.

Keep water away from the foundation.

Keep a close eye on the building foundation and adjust seasonally.
PROBLEM:
The site is no longer viable for supporting buildings
SOLUTIONS
Build it to move it!
SOLUTIONS
Build it to move it!
(this one is on skis)
Then was moved to...
It’s new home on solid ground!
Questions?
Thanks for listening!

CCHRC
(is built on permafrost)